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Foreign Agriculture

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OFFICE OF FOREIGN AGRICULTURAL RELATIONS, U. S. D. A
WASHINGTON, D. C.

DECEMBER
1952

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Foreign Agriculture

Vol. XVI • DECEMBER 1952 • *No. 12*

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FRONT COVER

Reindeer Roundup in Finland

Fall or early winter is roundup time in Finland's reindeer country. At that time the reindeer are counted and marked, and a certain number are selected for slaughter. When necessary the reindeer are also separated into individual herds according to ownership.

BACK COVER

Reindeer Area of Finland

The reindeer industry is confined to the Province of Lapland and a limited portion of the northernmost part of the adjacent Province of Oulu.

NEWS NOTES

Our Foreign Markets

"The importance to American agriculture of maintaining and, if possible, expanding our foreign outlets for farm products can be briefly illustrated by a few figures on recent production and trade. Since 1940, United States farm production has been increased about 30 percent across the board. In these 12 years, our outturn of wheat has increased 59 percent, corn 33 percent, cotton 15 percent, tobacco 53 percent, and milk production 4 percent. Soybeans and sugar beets have come into the picture in a big way, having practically trebled.

"In 1951, the last complete year of record, we exported 34 percent of our cotton, 23 percent of our tobacco, 48 percent of our wheat, 45 percent of our dried whole milk, 28 percent of our soybeans, and substantial quantities of other farm products including fresh and dried fruits. Many people do not realize that total farm exports in 1951 were 5½ times more by value, and more than double by volume, than what they were in the 1935-39 period, just before the war. Farm exports from 1951 production totaled about $4 billion, which was probably an all-time high. Maintenance of these foreign markets is not only essential to continued prosperity of American agriculture, but also to the maintenance of a high level of economic activity and full employment in this country. If we should lose a substantial part of these markets, I believe any serious-minded person must admit that the alternatives we would have to face would be either the accumulation of unmanageable surpluses at tremendous cost to the public or the reestablishment of production allotments and a cut-back in production all along the line. Such a regression would have very unpleasant consequences for all phases of our economy but they would be felt most severely by the American farmer." JOHN J. HAGGERTY, DIRECTOR, OFFICE OF FOREIGN AGRICULTURAL RELATIONS.

Credit for photographs is given as follows: p. 211, Reindeer Owners' Union; pp. 220-221, Dr. Henry C. Lint and U. S. Information Service; p. 223, Neuman Hnos; pp. 224-225, Print Hudson; p. 227, Jim Mitchell; pp. 230-231, Embassy of Indonesia.

FOREIGN AGRICULTURE ALICE FRAY NELSON, EDITOR

A monthly publication of the Office of Foreign Agricultural Relations of the United States Department of Agriculture, Washington, D. C. The matter contained herein is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of this publication has been approved by the Director of the Bureau of the Budget (November 1, 1950). Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at 15 cents per copy, or by subscription at the rate of $1.50 per year, domestic; $2.00 per year, foreign. Postage stamps will not be accepted in payment.

Reindeer in Finland

by ELMER A. REESE

Reindeer to most of us are figures of folklore, speeding lightly over housetops with St. Nicholas' sled. But to many people they are anything but legendary, for they are often the very means of subsistence.

Long before history was recorded—in the Stone Age—reindeer were used as pack and draft animals and as an aid in hunting. Ninth century records of Norway, in runic script, tell of the prominent position of reindeer in the lives of Norsemen: They took the place of the horse, the cow, the sheep, and the goat, serving as beasts of burden and providing meat, milk, and hides for wearing apparel. In this twentieth century, reindeer still hold an all-important place for thousands of people. For the Lapps of northern Finland, reindeer are an almost indispensable means of transportation in winter and practically the only means of livelihood.

Reindeer raising is one of the most rugged and difficult occupations anywhere because of the unfavorable climate of Lapland during most of the year, the barrenness of the land, and the remoteness of the area. For those who visit Lapland, however, reindeer raising has many picturesque aspects.

Some people are enchanted with the beauty of Lapland's solitude interrupted only by the passing of reindeer herds obediently following the sound of their leader's bell over the almost barren plains and snow-clad mountains where even the reindeer has difficulty in eking out a living. Many admire the Laplander's stamina, which makes it possible for him to follow his herd for days and nights over rugged, pathless distances, with only the assistance of his proverbially understanding dog. Many are interested in the Laplander's colorful costume—his reindeer-fur or navy-blue coat with multicolored trimming, his brightly colored scarves, and his four-pointed cap, said to represent the four directions from which the winds blow.

Reindeer raising is the way of life for almost 3,000 people, the genuine Laplanders who depend almost entirely on the raising of reindeer for a living. In all, there are about 20,000 reindeer owners in Finland today and in the neighborhood of 140,000 reindeer.

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Finland's Lapland

The Province of Lapland comprises about 30 percent of Finland's land surface but sustains only 4 percent of the population—about 170,000 people. Much of this region, particularly the more rugged terrain of the north and northeast, is covered by scrubby, slow-growing trees that seem to have no commercial value, but it produces lichen on which reindeer graze. This northern region, in contrast to the generally low, hilly topography of Finland, has an elevation of more than 650 feet and is bounded on the north, northeast, and east by a semicircle of partly snowclad mountains known as tunturit, or arctic mountains. In these mountains, and even in the less rugged terrain, reindeer are practically the only available means of subsistence for the native inhabitants, the nomadic Lapps.

Roads are limited in number and unimproved. In the long winter months it is difficult to travel in much of the area. Snow 2 to 3 feet deep usually covers the ranges about 180 days in southern Lapland and 210 days in the extreme north. The mean temperature for January is 7.5°F. and for July, 54.5°. In midsummer the sun does not set for 60 days, and for two long cold winter months the Laplander is without sunshine. The reappearance of the sun is hailed with joy, since the inhabitants, except the herdsmen, are generally confined to their huts in the cold semidark winter season.

Lapland has only about 2 percent of Finland's tillable land and is able to produce only a limited quantity of fodder crops (hay and oats for hay) and potatoes, primarily because of the unfavorable climate. Oats, spring- and fall-sown rye, turnips, timothy grass, barley, and potatoes can grow and are usually grown in southern Lapland, but do not always mature.

Livestock, other than reindeer, are raised and contribute much to the economy of Lapland. In 1949 there were about 10,300 horses, 47,600 cattle, 43,000 sheep, and 1,400 hogs. According to the best data available on reindeer numbers there were 119,000 head in 1949, 124,000 in 1950, and 138,000 in 1951. These numbers indicate the economic and social importance of the reindeer industry in relation to other types of livestock. But its chief significance lies in the fact that vast areas of relatively barren land are put to productive use.

Reindeer Husbandry

Reindeer feed largely on lichen—reindeer moss (*Cladonia rangiferina*)—which grows slowly but in great abundance in the north of Europe, particularly in Lapland, as well as on the tundras of Siberia and on the plains of Arctic America. It grows most luxuriantly in Lapland and sometimes reaches a foot in height. In the wintertime, reindeer are able to feed on the lichen by scratching it up from under the snow with their feet and by the aid of their antlers. The existence of the reindeer depends on this important plant. In several countries including the Soviet Union much effort is reportedly put forth to promote its growth.

During the autumn, reindeer frequently move to the seacoast to escape the mosquitoes and gadflies, and to feed on the marine algae that have been cast upon the shore by tidal waves. Laplanders, with their entire households, accompany the herds on their annual migration.

Many Laplanders depend on the reindeer and sled for winter travel.

According to 1939 data, there were almost 240,000 reindeer, belonging to 16,000 owners (including family members who frequently have their own reindeer). Among these were about 2,400 genuine Laplanders who depend primarily on the raising of reindeer for their livelihood and have continued to pursue their nomadic way of life.

For these Laplanders the annual slaughtering season is comparable to harvesttime on the ordinary farm. It is estimated that some 10 reindeer must be slaughtered each year to provide the nomadic Laplander with the necessary subsistence. On this basis a family of five need about 50 reindeer. In normal years there are enough to meet this need. In bad years, for instance when food supplies for wolves and other wild animals become scarce, reindeer herds may sustain losses in excess of the normal increase. Reindeer husbandry, therefore, is not only picturesque and rugged, but also a somewhat uncertain enterprise at times.

The capital invested in reindeer in 1939 in terms of present prices and currency totaled about $5.2 million and the total annual output was valued at $1.06 million including $736,000 of exported products.

During the war years 1940-45 the industry experienced a severe setback. Under orders from the Ministry of Supplies some 180,000 reindeer were slaughtered to provide meat for the front-line troops. The quantity of meat expropriated in this manner reached about 26 million pounds. Because of the critical period, it was fortunate, however, that animals in such numbers were available in these remote areas for military use.

At the end of the war there were only about 74,000 reindeer, but by the end of 1951 the number, as previously mentioned, had increased to 138,000. The productive capital value of the industry was about $2.83 million last year and the annual output represented about $563,000. If the next 2 or 3 years are favorable to reindeer raising, it is believed numbers will reach 200,000 by 1955.

Protection of the Industry

Notwithstanding the fact that Finland is a free country and permits private enterprises to grow and prosper within its borders, it has set up rather rigid controls over the reindeer industry in the Lapland and Oulu Provinces of the north. Finland took this action because it wished to preserve an industry that thrives in its northland. First steps were taken as early as in 1926 when the Finnish Reindeer Breeders' Association (Suomen Poronjalostusyhdistys) was established to protect, perpetuate, and promote reindeer raising. In 1932 a law governing the industry was enacted but was replaced by a more up-to-date law in 1948. Prior to the enactment of the new law the Agricultural Committee of the Finnish Diet thoroughly investigated the reindeer industry; members of the committee visited Lapland to learn about the peculiarities of the industry and to talk with both farmers and reindeer owners.

The 1948 act gives the reindeer industry a priority over agriculture in certain areas and in certain respects. Reindeer are free to graze on grass, leaves, and lichen anywhere within the designated reindeer industry area irrespective of the wishes of the landowner or tenant. But he may be reimbursed by the reindeer owners' local organization (Paliskunta) for any injury to his young forests, cultivated fields, and meadows or to his stacked hay, lichen, and leafy twigs. The organization may join with a landowner or tenant in building such protective devices for his property as fences or sheds. But if the landowner, or the tenant, refuses to cooperate, the Paliskunta need not pay him for injury to his property. A board of arbitration determines the damages and the share of building costs payable by the Paliskunta and by the landowner or tenant. If the claimant is dissatisfied with the decision, he can appeal to the local court of law. The general policy of the Reindeer Owners' Union (Paliskuntain Yhdistys), the central organization that administers the Reindeer Act, has been to recommend to the locals the conclusion of amicable agreements with landowners and tenants concerning the prevention and eventual settlement of damages.

Another basic section of the law provides that specified state-owned land in northwestern and northeastern Lapland may be designated as a kind of game reserve in the sense that prospective farmers before acquiring land in these areas must waive their right to compensation for property damage caused by reindeer. Individual farms that are likely to impede the raising of reindeer cannot be established in some of the northernmost areas of Lapland.

The law more or less regulates the local organization in addition to establishing the basic pattern for its operation. It provides for employment of certain personnel and regulation of grazing, as well as payment of damages, joint building, and the arbitration board, which not only determines damages, but also recommends protective measures and decides controversial issues.

The law provides for the application of a ceiling on reindeer numbers to ensure adequate local grazing and feed supplies. Foreigners are not permitted to bring their reindeer into Finland for grazing or transit. Absentee ownership of reindeer is forbidden and each owner must be a member of the local Paliskunta.

Organization of the Industry

As a result of the protection and promotion given the reindeer industry in northern Finland, it has become highly organized in the past 10 years. The area is divided among 65 Paliskuntas, which are responsible for practices that protect herds, promote improvement of animals, hold down the amount of damage done by animals, and generally encourage the industry. Each Paliskunta employs a foreman (usually a large reindeer owner) and hires several herders. The expenses of the organization are met by collecting dues from each member on the basis of the number of animals he owns.

Each fall or early winter the reindeer are assembled, counted, marked, and, if necessary, separated into individual herds according to ownership. At this time, the foreman of each local makes up lists to serve as a basis for determining the voting rights and taxes of the owners. It is during this period that the herders must tend the animals. At this time, too, locals sometimes arrange for the winter grazing.

Owners residing within the boundaries of a Paliskunta and possessing at least one reindeer are considered to be shareholders of the organization. An owner cannot be a shareholder in more than one local. Reindeer may be moved from one Paliskunta to another but only to be used for pack, draft, or slaughter animals. Those for pack or draft purposes are subject to a small tax.

The maximum number of reindeer that a local organization is permitted to maintain, as well as the maximum number each owner may possess, is determined in advance for a period of 10 years by the Finnish Cabinet. The determination is based on a proposal of the Reindeer Owners' Union. If grazing becomes scarce or inadequate within the boundaries of a local organization, or if other hazards appear to threaten the continuance of normal reindeer husbandry, the Provincial Government of Lapland may propose to the Cabinet temporary restrictions with regard to the industry in the area.

Each Paliskunta holds meetings at least twice a year at which every owner has as many votes as he has animals but cannot cast more than one-twentieth of the votes of his local.

The Reindeer Owners' Union is the connecting link between the local Paliskunta organizations; its duties are principally to implement the law, improve reindeer husbandry, promote research, and carry on experimentation and breeding of reindeer. In addition, there are such administrative duties as approving marks for the marking of animals of individual owners, registering these markings, issuing instructions, publishing a magazine known as Poromies (The Reindeer Breeder), advertising of reindeer products, etc.

Commercial Aspects

The Reindeer and Wild Game Company Incorporated (Poro ja Riista OY), a commercial organization established by the Reindeer Owners' Union, is responsible for the marketing and refining of reindeer products and for related functions. The seven local centers of the cooperative slaughterhouse, Karjapohja, act as purchasing offices of reindeer products. Several more slaughterhouses, which have freezing and canning plants, were or are being completed this year.

Before the war Finland exported about 2 million to 3 million pounds of reindeer meat and 40,000 hides a year. The meat was sent largely to Norway, Sweden, and Germany, with small quantities going

Lapp family of Finland's northern mountains photographed in front of their turf home. Families in this area depend on reindeer for a living.

to Denmark. Most of the meat was exported in cuts rather than as carcasses. The export price averaged about 21 to 27 cents per pound, at present currency rates. The hides were exported mainly to Germany and sold for about $3.00 apiece.

Generally, slaughtering of reindeer may occur in four to six different locations within a Paliskunta, for the animals may be located as much as 250 miles from a central slaughterhouse. It is impossible to haul or drive them that distance, since the slaughtering usually takes place during December, January, and February when there is so much snow on the ground that many of these areas are inaccessible by truck.

Prior to slaughtering, according to the Finnish law, reindeer must be inspected by an authorized veterinarian.

After slaughtering, the animals are skinned, the internal organs are removed, and the carcasses are hung for 6 to 12 hours. They are then taken to the central plants in Rovaniemi, Tornio, and Oulu for further processing and freezing. Reindeer used in the preparation of cured boneless meat for export have to be slaughtered under the supervision of an authorized veterinarian in one central location, and curing and processing must conform to the requirements of the importing country.

More and more Laplanders have been raising reindeer for meat in the past decade or two. In recent years, about 20,000 reindeer, with an average weight of about 100 pounds, have been slaughtered annually, and nearly one-half of the almost 2 million pounds of meat produced has been available for export.

During the days immediately following the termination of slaughter, the meat is salted, frozen in snow or ice, or cured in the smoke of the huts (the homes), and loaded into special sleds and stored for future use and transportation from place to place with the nomadic family. The meat and hides that the family does not need are sold through its sales organization. Steak, cured meat, and tongue are the special delicacies sold in Finnish and foreign markets.

Some International Aspects

The practice of permitting reindeer to graze over wide areas and frequently to migrate great distances in search of food has created an international problem in the northland—a problem that is well on the way to being solved, however. A compensatory treaty between Finland and Norway has been formalized, and these countries are building border fences. The fence between Finland and Norway has not been completed and as a consequence some of the Norwegian and Finnish reindeer still intermingle, particularly in the fall of the year. Under the compensatory treaty, there exists an arrangement whereby the animals can be returned within a specified time or a settlement can be made once a year on the basis of marked animals that have migrated to and remained in the country.

Recent estimates indicate that thousands of Finnish reindeer cross the border into Norway each year. Some 7,000 are reported to have migrated to Norway in 1951, compared with about 4,000 in 1950. Preliminary information places the number for this year at 3,000. The fence that is being erected between the two countries is expected to stop this migration. Migration between Sweden and Finland is practically nonexistent because of the river boundary separating the two countries.

Finland has built a reindeer fence about 5½ feet high for a distance of about 390 miles along the Finnish-Soviet border to prevent the reindeer from wandering into the Soviet area.

Industry an Economic Necessity

During the past 10 years, Lapland's population has increased by about 25 percent. And in these years, Lapland has been without some of its most important industries, for the peace treaty between Finland and the Soviet Union deprived Lapland of such resources as the Petsamo nickel mines, the Liinahamari deep-water port on the Arctic Sea, and the possibility of developing international tourist trade along the famous Petsamo highway.

Against this background of rising population and lost occupational opportunities, the importance of the reindeer industry is heightened, both as a full-time occupation in arctic areas and as a supplementary industry to agriculture in those parts of Lapland where limited farming is possible.

With the safeguards put around the reindeer industry and the support given by the government, it appears that the reindeer will play a prominent part in the life of the Laplander for many years to come. It will continue to provide him with food, clothing, and a salable commodity, and it may well be that the Laplander, like St. Nicholas, will always travel in a reindeer-drawn sled.

Europe's East-West Trade In Food, 1950 and 1951

By LOIS BACON*

In a statistical note published in the April 1951 issue of FOREIGN AGRICULTURE, *West Europe's prewar and postwar imports of food from East Europe were compared in some detail. The present note carries the postwar data forward through 1951, and revises some of the data published earlier.*[1]

Europe's east-west trade in food declined somewhat in 1950, and dropped abruptly in 1951 to less than three-fourths of the peak postwar level reached in 1949. In that year, net imports from East Europe amounted to around 6 percent of the calorie value of West Europe's net imports of food from all countries, as compared with 20 percent in the late 1930's.

The decline in net imports of food in 1950 and 1951 reflects in large part a drop in net imports of bread grains. As table 1 shows, the drop in bread grains more than offset an increase in feed grains. A break-down of gross imports of grain by country of origin, given in table 2, discloses that imports of feed grains increased only because of an increase in takings from the Soviet Union. Feed grain imports from the rest of East Europe dropped to the low 1948 level in 1950, and below it in 1951.

One of the major causes of the drop in east-west grain trade was severe summer drought in the Danube Basin in 1950 and in Poland in 1951. Another seems to have been the diversion of grain from commercial and export channels to the production of livestock products for foreign as well as home markets. Stockpiling in the Soviet-dominated countries probably also limited grain exports to the west, not only because of set-asides of domestically grown grain but also because of shipments from the Soviet Union for that purpose. This would help explain the continued high level of intra-East European trade in grain. Czechoslovakia alone received 900,000-950,000 tons of Soviet grain in 1951, as compared with more than a million tons in 1949. Such imports apparently gave Czechoslovakia a grain supply larger than in prewar for a human population 14 percent below prewar. It is true that the hog population was considerably above prewar, according to official estimates. However, since Czechoslovakia was importing meat as well as grain, and meat supplies have remained short in urban areas, an increase in the quantity of grain fed to livestock probably accounts for only part of the apparent increase in grain supplies. Unless overestimation of production makes the increase in grain supplies more apparent than real, it seems likely that some of the Soviet grain was stored or diverted from Czechoslovakia to nearby countries. Czechoslovakia has good storage facilities whereas storage is a problem in the Soviet Union.

In addition to the grain sent to Czechoslovakia, at least 500,000 tons were shipped to Finland, the Soviet Zone of Germany, Poland, and Albania from other East European countries, not to mention the grain turned over to the Soviet Union on occupation or reparations account. In the same year, East Europe also sent some 350,000 tons to non-European countries, mainly Egypt and India. But if all East European exports, including a generous allowance for exports unrecorded here, had been directed to West Europe, it is doubtful whether Europe's east-

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*The credit for the statistical computations for 1950 and 1951 belongs to Bertha Magid.

[1] In this statistical note, as in the first one, "East Europe" refers to the following countries within their present frontiers for both prewar and postwar trade: the Soviet Union, Poland, the Soviet Zone of Germany, Czechoslovakia, Hungary, Rumania, Bulgaria, Albania, Yugoslavia, and Finland. "West Europe" refers to the remaining part of Europe, including the British Isles.

An explanation of the data, which are based on the trade statistics of West European countries, and the construction of the tables was given in the first note, and will not be repeated here. It should be pointed out, however, that the problem of determining West Europe's trade with the Soviet Zone of Germany has become much easier in the past 2 years, for among the West European countries important in the trade with East Europe, the United Kingdom and Switzerland are now the only countries that do not distinguish between trade with Western Germany and the Soviet Zone in their trade publications.

west trade in grain in 1951 would have reached 75 percent of the prewar level.

The influence of the poor 1950 harvest on east-west trade in livestock products was not felt until 1951 when West Europe's imports of meat, eggs, and animal fats from the east fell heavily from the postwar peak reached in 1950. Net imports of meat into West Europe dropped more than gross imports, for more meat moved from west to east in 1951 than in 1950. Poland accounted for three-fifths of the meat exported from East to West Europe in 1950, and for three-fourths in 1951. Poland also remained the major East European supplier of eggs to the west, with nearly three-fifths of total east-west egg exports in both 1950 and 1951.

East-west shipments of animal fats in 1950 were about two-thirds as large as east-west shipments of vegetable oils, which also rose to a postwar peak in that year and then fell heavily. In 1950, for the first time since the war, West Europe's imports of oils and fats from East Europe exceeded its exports of butter, hogfat, tallow, and marine oils to East Europe.[2] In 1951, however, East Europe again had a net import of fats and oils, both because of an increase in imports, chiefly into Yugoslavia, the

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[2] It should be noted that oilseeds and vegetable oils from overseas that are imported by East Europe through West European processing industries or shipping routes are not considered in this or the previous note as west-east trade in Europe.

TABLE 1.—*West Europe's net imports of food products from East Europe, prewar, and 1947 to 1951*[1]

Foodstuffs	In absolute quantities						In percent of net imports from all countries[2]					
	Prewar[3]	1947	1948	1949	1950	1951	Prewar[3]	1947	1948	1949	1950	1951[4]
	1,000 metric tons	*1,000 metric tons*	*1,000 metric tons*	*1,000 metric tons*	*1,000 metric tons*	*1,000 metric tons*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Grain:												
Wheat and rye	3,200	110	650	1,100	705	470	26	1	4	8	6	3
Other, excluding rice	2,400	110	1,200	1,040	1,130	1,205	20	2	16	12	16	17
Total	5,600	220	1,850	2,140	1,835	1,675	22	1	8	10	9	8
Sugar	775	100	(5)	155	180	190	26	4		6	7	9
Potatoes	1,300	80	(5)	(5)	40	(5)	(6)	(7)		...	(7)	...
Dry legumes	165	8	5	15	30	(5)	36	2	2	6	12	...
Other vegetables	(5)	(5)	45	55	20	15	...	...	17	13	17	(7)
Fruit	(5)	(5)	(5)	15	(5)	(5)	...	...	...	1	...	...
Meat (carcass weight)[8]	200	(5)	20	40	110	60	12	...	2	3	12	6
Fats, fat content[9]	20	(5)	(5)	(5)	30	(5)	1	...	...	...	1	...
Cheese	(5)	(5)	(5)	3	3	5	...	...	...	2	3	5
Eggs	20	2	12	16	32	16	13	1	10	11	23	16

Office of Foreign Agricultural Relations, October 1952.

[1] For the definition of East and West Europe, *see* text footnote 1, and, for background information on the construction of the table and the prewar and postwar data, *see* "Europe's East-West Trade in Food," *Foreign Agriculture* April 1951.

[2] Net imports from East Europe for the calendar years 1947 through 1951 have been compared with net imports from all countries in the fiscal years 1947-48 through 1951-52.

[3] "Prewar" refers to a 4- or 5-year average within the period 1933-39.

[4] Preliminary.

[5] Exports to East Europe exceeded imports from that area.

[6] West Europe had a net export to non-European countries.

[7] West Europe had a net export to all countries.

[8] Includes meat from imported live animals.

[9] Includes butter, slaughter fats (as such and from imported live animals), marine oils, and only those oilseeds or oil produced from those seeds that are grown in Europe.

Soviet Zone of Germany, Finland, and Czechoslovakia, and because of a decrease in exports, originating mainly in Hungary and Poland, which accounted for some three-fourths of total exports to the west in both 1950 and 1951.

Sugar stands out as one of the few food products that bulked larger in the 1951 than in the 1950 east-west trade. Nearly all of East Europe's exports to the west came from Czechoslovakia, the Soviet Zone of Germany, Poland, and Hungary. Total exports from these four countries were certainly higher than is indicated by table 1, for they also shipped 35,000 tons to Finland in 1950 and again in 1951, and far larger amounts, in all probability, to the Soviet Union. The Soviet Union in its turn supplied Finland with 35,000 and 39,000 tons in 1950 and 1951, respectively, and Iran with 33,000 tons in 1951.

Most East European countries could ill afford to export food in 1950 and 1951. The food situation in the Soviet Union appears to have shown some improvement compared with the early postwar years, consumption in Finland was at satisfactory levels, and some rations were abolished and others increased in the Soviet Zone of Germany. Elsewhere, however, more or less severe food shortages appeared in 1950-51. Rationing had to be reintroduced in Czechoslovakia (most foods), in Hungary (flour, sugar, fats), and in the urban centers of Poland (meat, fats, sugar). Rumania, Bulgaria, and Yugoslavia still had rationing systems, and Yugoslavia could meet rations only because of relief shipments from the United States.

Following a good harvest in 1951 in the Danube Basin the situation there improved, and Yugoslavia, Hungary, and Bulgaria dispensed with rationing. In 1952 poor weather again reduced crop output in the Danube Basin, while growing conditions in the rest of East Europe have reportedly been below or no better than average. In these circumstances some recovery in east-west trade in food in the calendar year 1952, reflecting the 1951 recovery in crop output, and a recession in the calendar year 1953 would not be surprising; in fact an increase at least in the grain trade in 1952 appears likely, judging by the scanty information presently available. Soviet grain exports to the west in the first 8 months of 1952 ran ahead of exports during the corresponding period of 1951, Yugoslavia (though it will be a net importer in the season 1952-53) exported more grain to Western Germany in the first 6 months of 1952 than to all countries in all of 1951, and Poland is reported ready to increase its grain exports in the 1952-53 season.

The movement of production in East Europe, however, cannot be taken as a reliable guide to the movement of east-west trade in food. If stockpiling ceases or especially if the Soviet Union should decide that its political or economic interests would be best served by a concerted effort on the part of Soviet-bloc governments to expand exports to the west, such exports would probably increase though production declined. At present the Soviet Union is taking a different line. Controls by the west on exports of strategic materials to the east may have hampered east-west trade in food in recent years. Tightening of the controls since 1951 has certainly prevented the striking of some bargains in 1952. It may well be the reason why the Soviet Union, in this year's round of trade negotiations with the United Kingdom, limited its grain export commitment to 200,000 tons for a 3-month period, as compared with 1,000,000 tons committed in 1949 and 1951, and 800,000 tons committed in 1950, each time for a 12-month period.

Restriction of food exports to the west would not necessarily pose the problem of unmanageable surpluses in East Europe. With the growth of industry and urban centers continuing to stimulate domestic demand particularly for livestock products, little more than a relaxation of farm-to-market controls would be required to ensure a marked shift in production from grain for export to livestock products for home consumption, and an improvement in consumption levels, which still compare unfavorably with those in most West European countries. Pressure of domestic demand in itself tends to hold down East European exports, for, while the population of East Europe exceeds the prewar level, agricultural output remains well below it, and government efforts to raise the level of productivity are not likely to meet with much success as long as the drive for collectivization, now relaxed, now intensified, continues to disturb the organization of production. Prospects of any strong and sustained recovery of east-west trade in food thus seem remote.

TABLE 2.—*West Europe's gross imports of grain from East Europe by country of origin, average 1934-38, and annual 1949 to 1951* [1]

Grain and period	Soviet Union [2]	Poland	Eastern Germany [3]	Czechoslovakia	Hungary	Rumania	Bulgaria	Yugoslavia	Total
	1,000 metric tons								
Wheat:[4]									
Prewar frontiers 1934-38	605	50	225	60	443	506	63	103	2,055
Postwar frontiers 1934-38	800	150	75	60	443	350	70	103	2,051
1949	323	1	...	11	70	...	...	9	414
1950	190	10	24	48	154	14	10	11	461
1951	242	...	15	(6)	74	67	(6)	...	398
Rye:									
Prewar frontiers 1934-38	181	210	650	1	50	54	4	3	1,153
Postwar frontiers 1934-38	250	775	50	1	50	...	30	3	1,159
1949	66	509	...	...	177	...	...	...	752
1950	38	152	58	...	35	...	40	...	323
1951	105	15	6	(6)	13	10	9	(6)	158
Barley:[5]									
Prewar frontiers 1934-38	314	269	200	140	20	307	5	7	1,262
Postwar frontiers 1934-38	575	300	50	140	20	150	15	7	1,257
1949	161	19	[7] 9	32	45	6	...	17	289
1950	332	5	[7] 3	78	30	...	...	...	448
1951	510	30	[7] 15	73	9	...	(6)	...	637
Oats:									
Prewar frontiers 1934-38	53	37	150	15	...	13	...	4	272
Postwar frontiers 1934-38	53	37	150	15	...	13	...	4	272
1949	28	90	...	...	30	5	...	...	153
1950	85	...	4	...	1	4	...	...	94
1951	178	...	(6)	...	...	...	...	...	178
Corn:									
Prewar frontiers 1934-38	31	...	...	2	61	421	46	321	[8] 882
Postwar frontiers 1934-38	150	...	...	2	61	275	75	321	[8] 884
1949	96	...	...	(6)	178	26	20	262	582
1950	344	...	...	...	25	34	6	193	602
1951	328	...	...	...	16	8	...	44	396
Total:									
Prewar frontiers 1934-38	1,184	566	1,225	218	574	1,301	118	438	5,624
Postwar frontiers 1934-38	1,828	1,262	325	218	574	788	190	438	5,623
1949	674	619	9	43	500	37	20	288	2,190
1950	989	167	89	126	245	52	56	204	1,928
1951	1,363	45	36	73	112	85	9	44	1,767

Office of Foreign Agricultural Relations, October 1952.

[1] For the definition of West and East Europe, *see* text footnote 1, and, for background information on the construction of the table and the prewar and postwar data, *see* "Europe's East-West Trade in Food," *Foreign Agriculture,* April 1951. Finland and Albania have here been omitted from East Europe, since West Europe's grain imports from those countries are negligible. Because of the inclusion of Finland and of minor grains in table 1, net imports of "other grain, excluding rice" in 1949 is slightly higher than the total for gross imports of barley, oats, and corn as shown here. Dots indicate that imports, if any, are not separately specified.

[2] Data for prewar as well as postwar frontiers include trade of the Baltic countries.

[3] Includes the territory east from the present boundary line between the western zones and the Soviet zone.

[4] Includes flour in terms of wheat equivalent.

[5] Includes malt in terms of barley equivalent.

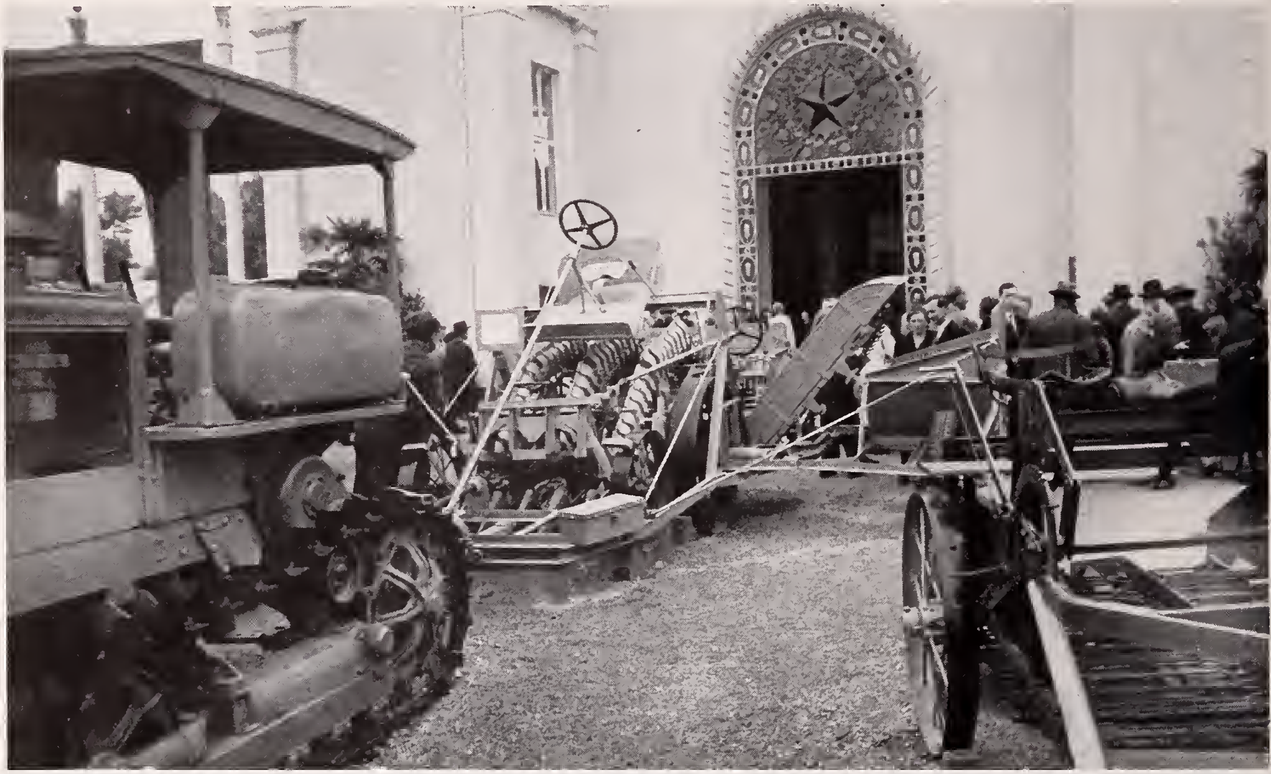
[6] Less than 500 tons.

[7] Some of these imports may have come from Western Germany.

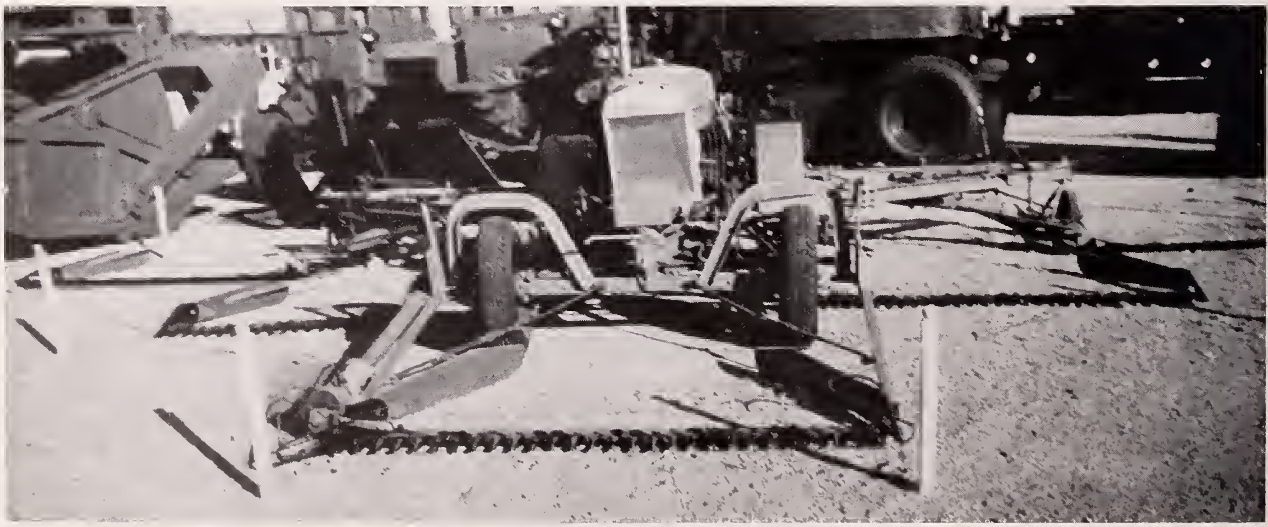
[8] Assuming that German imports (192,000 tons) went to Western Germany.

Russian Farm Machinery

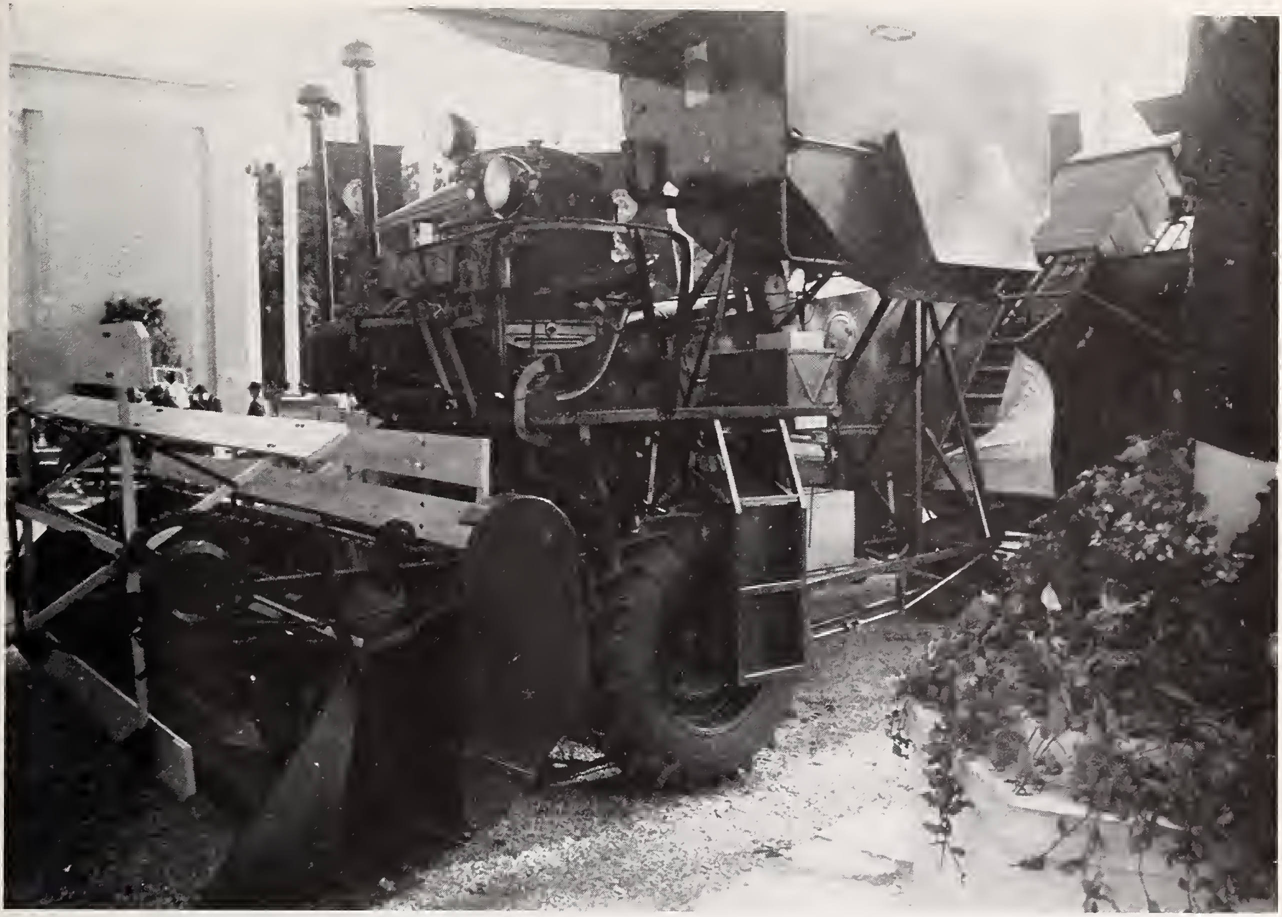
Large crowds viewed the Soviet Union's machinery exhibit at the recent Fall Fair in Vienna. The following photographs were taken by the American Agricultural Attaché and the U. S. Information Service.



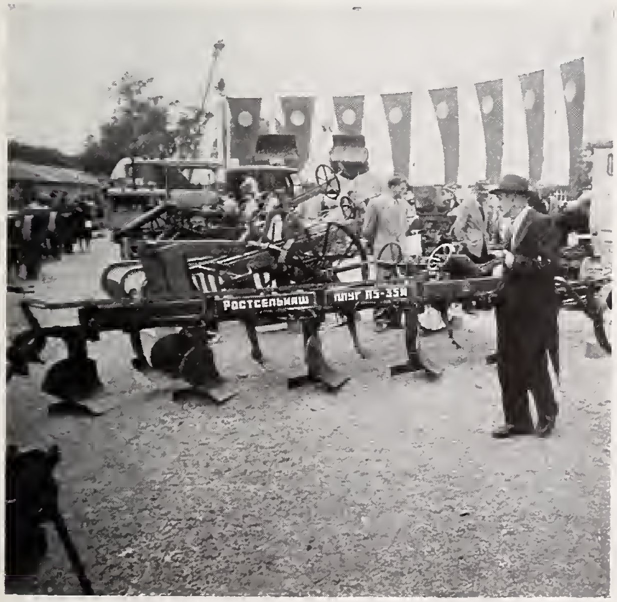
Caterpillar tractor and beet harvester (left); two-row potato digger (right foreground). The Russians exhibited many different farm machines but gave no indication of the number of each available.



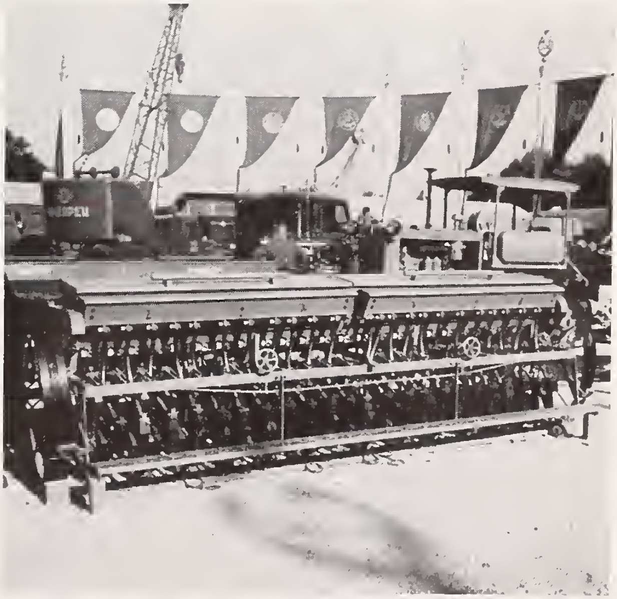
Five-gang mower, designed to cut a 33-foot swath. Such mowers disappeared from United States farms many years ago, for they were considered unwieldy and uneconomical.



This self-propelled grain combine, like much of the machinery exhibited, shows little design engineering, and it is a much more complicated piece of machinery than its United States counterpart.



Five-bottom gang plow. Few plows with jointers are seen on American farms today, for they are easily clogged.



Combination grain drill and grass seeder (rear view). Most American drills have smaller, rubber-tired wheels.

Guano, Enricher of Peruvian Soils

How long-term national planning can conserve an important resource and keep it productive for the needs of the future.

By ROY O. WESTLEY

For countless centuries, millions of sea birds have inhabited a group of islands off the Peruvian coast, eating the anchovy fish that swarm in the surrounding waters, and depositing vast stores of guano—the fertilizer composed of droppings and carcasses of the birds. Guano represents one of Peru's major national assets and one that is renewed year by year as an "ever normal" source of productivity. Its high nitrogen content renders it many times as effective as any known barnyard manure.

Guano was used as fertilizer by the Incas in pre-Hispanic days and the birds that produced it were protected. But following the first commercial exports of guano in 1840, the rich deposits—more than 100 feet thick in some places—began to dwindle faster than they were being laid down. The Peruvian Government envisioned the inevitable result, and in 1909 formed the Guano Administration Company, which controls the conservation, harvesting, and distribution of the fertilizer and protects the birds. The government controls 51 percent of the company's stock. Because of the company's conservative practices and scientific management, the production of guano increased from 70,000 metric tons in 1909 to 237,071 metric tons in 1951.

Guano has exerted a profound influence on the nation's economic and political life for centuries. Without it the coastal farmers could not grow crops in their thin topsoil. In fact, the present domestic demands far exceed the supply, and no more than 10 percent of the annual production may legally be exported. Last year only 39 tons were shipped out of the country. At one time considerable quantities were exported to several countries, including the United States, where it was used principally on cotton. In Peru, it is the principal fertilizer for cotton, sugarcane, and rice but is also used on alfalfa and truck crops. In 1951 the Guano Company imported 11,756 metric tons of other fertilizers, mostly ammonium sulfate, to supplement the guano used in Peruvian agriculture.

During the past 2 years the company has developed a mixing plant near the port of Callao and may install others elsewhere on the coast, to grind and mix the guano so that a uniform product may be sold in hermetically sealed bags.

Ground guano has proved its worth over the coarsely milled type. Tests made at Peru's National Agricultural School and by private individuals showed that the use of ground guano increased crops by as much as 25 percent over the coarse type used by 99 percent of the Peruvian farmers. Tests on drying guano to prevent loss of nitrogen by evaporation are under way, as well as experiments to prevent loss of ammonium carbonate from the fertilizer. These basic tests are of great importance to the Peruvian economy and their efficiency will be increased by the installation of modern machinery and equipment.

There is little doubt that efficient grinding and mixing will effect a notable advance in the country's agriculture. This will be the first step toward the utilization of rational fertilizers, by balancing the principal chemical elements in accordance with requirements of different types of farming and of agricultural zones.

"Guano de Islas," which is the Peruvian name for guano, is extremely rich in nitrogen and phosphorus but relatively poor in potash. The fertilizer is marketed as "rich" or "poor" guano, depending on its nitrogen content. Rich guano contains from 9 to 15 percent nitrogen, 9 to 12 phosphorus, and 1 to 2 percent potash. Poor guano contains only 1 to 2 percent nitrogen, 16 to 20 percent phosphorus, and 1 to 2 percent potash.

About 80 percent of Peru's guano comes from the guanay, or Peruvian cormorant, which, because of its white breast, black wings and back, and its erect standing posture, resembles certain types of penguin, or even "a little man in a tuxedo." The remainder of the guano deposits are attributed to the piquero, or Peruvian booby (15 percent), and the alcatras, or brown pelican (5 percent).

Nowhere in the world is there such a great concentration of guano birds as on the Peruvian islands. It is estimated that more than 30 million of them live there. While feeding, they fly close to the water and dive for the small fishes, which are

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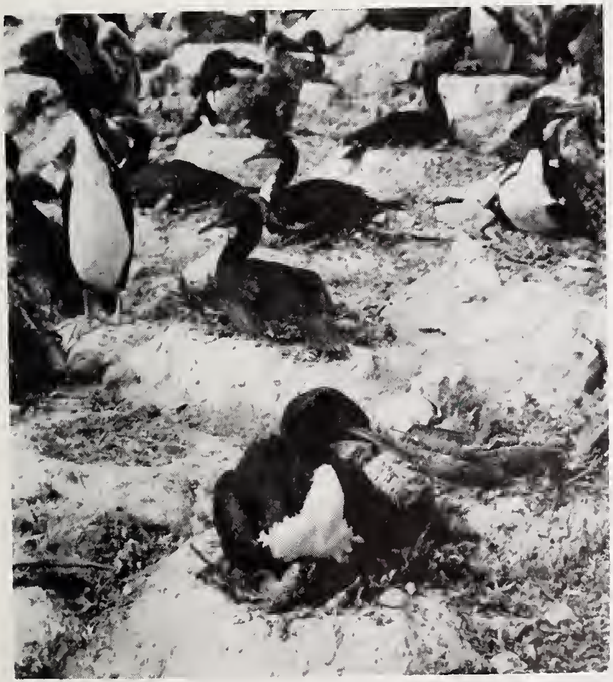
Mr. Westley is Agricultural Attaché, American Embassy, Lima, Peru.

brought to these waters by the cool Humboldt Current. To drive along the sea wall and look out over the water at the black, throbbing waves of moving wings is an unforgettable sight. At a distance the islands appear white because of the guano, but as one gets closer they seem to have a black top-coating; this is the illusion created by the dark backs and wings of the birds. One island may be the home of from 1 million to 4 million birds. During the nesting season only officials and workers are allowed on the islands. The American ambassador, H. H. Tittmann, and I were taken on an inspection tour during the nesting season and got a close-up view of the birds' habits. The nests are made from feathers pulled from the body of the female and placed in a circle slightly larger than the body of the bird. The nests are close together on the wet, slimy guano, and each hen lays from 1 to 4 eggs. There is little stealing of eggs but there is constant strife over the stealing of feathers from the nests. Each day the males go out to feed and return to sit on the eggs or young while the females take their turn at foraging.

The birds are so important to the country's economy that their habits and welfare have been given constant attention for centuries. In the early days, anyone who disturbed them at their mating or nesting was threatened with the death penalty.



The guanay, or Peruvian cormorant, makes its nest of feathers on shallow depressions in wet guano. This bird supplies Peru with most of its guano, the country's most important fertilizer.

Great concern was caused last year by certain oceanographic and climatic conditions that have greatly influenced the health and reproduction of the birds. It was noted that there was considerable migration toward the south during the year, and only about 6 million birds were left in the central ecological zone. This migration, together with an epizootic disease that killed more than 12 million of the piqueros, drastically reduced the total population during 1951. Also as a consequence of oceanographic and climatic changes, anchovies appeared onlv sporadically and caused the birds to abandon their eggs and young all over the islands. This resulted in a more than 50-percent decrease in reproduction efficiency. Fortunately, the isolated peninsulas have proved of great value as sanctuaries during migration periods, when the birds move from the ecological center toward the south. Most of the birds have decided, for reasons of their own, to remain quietly at these points instead of proceeding to the Tarapacá Desert as was formerly the case. The latter is an area of insufficient food, and many of the birds that light there die of starvation.

These things are beyond the control of man, but disease and predators are not. Officials of the Guano Company provide medical attention to sick birds whenever possible and maintain improved sanitary conditions. The company also has built walls to protect the birds from predatory animals such as seals and to prevent the guano from slipping off into the sea. The guano is collected and, in some cases, transported on small dump cars on a narrow-gage track to a loading point on the island, where it is sacked or shipped in bulk to the mainland in steamers or sailing vessels belonging to the company. The islands are harvested biennially, in rotation and at the proper time, to avoid reducing the breeding potential of the birds. The birds are protected from any kind of intrusion, even airplane noises, ship whistles, and fishermen.

The Guano Company's efforts to make the lives of the birds healthier, happier, and more productive constitute one of the outstanding wildlife conservation programs of our day.

The story of guano bird conservation can be carried one step further—this time with Nature taking the lead again. Part of the 33 pounds of annual excrement per bird falls in the sea, where its rich salts nourish the plankton, which is consumed by anchovies, the food of the guano birds.

Fur Industry of Kastoria

By PRINT HUDSON*

The small town of Kastoria in northern Greece is the home of a little-known adjunct of the fur industry — making garments from scraps of fur. Three-fourths of the 10,000 people of Kastoria are engaged in this activity, which last year provided 85,000 pounds of completed furs for export. Nearly all of them were made from small pieces of fur and most of them went to the United States.

This unusual industry began more than 600 years ago, when Kastoria was a small fishing village to which officials, princes, and even emperors came in exile. In those days, a person's standing was indicated by the furs he wore—the higher his title, the more luxurious his furs.

Many of these people had to stay in exile year after year; their furs began to wear and they were unable to buy new ones. Some of the servants and some of the Kastorians began to turn the worn furs and repair them. As time passed, they became highly skilled in salvaging the best parts of a piece of fur, matching the pieces, and sewing them together. Thus there developed in Kastoria this handicraft, which has been handed down from generation to generation and which today also is carried on in Italy, Belgium, and the Netherlands, where it was taken by Kastorians who emigrated to these countries.

It is probably emigration that has kept the industry in Kastoria alive, for many Kastorians have established themselves as fur makers and merchants in the various large cities of the world. They purchase and send to their friends and relatives at home the discarded scraps and trimmings from the skins on which they have worked. The scraps are received in bales of about 500 pounds, for 20 to 25 cents a pound. Last year Greece imported about 250,000 pounds of these small pieces of fur, duty-free.

Since each bale contains the scraps as they accumulate on the trimming floor, the pieces have to be classified—by animal, the part of the body from which they came, length of hair, color, and so forth. In the process, about half of the scraps are discarded. The rest are matched and trimmed with small sharp knives into pieces that can be fitted together. These small cuts are assembled on paper

To classify a small piece of fur by the part of the animal's body from which it came requires much skill.

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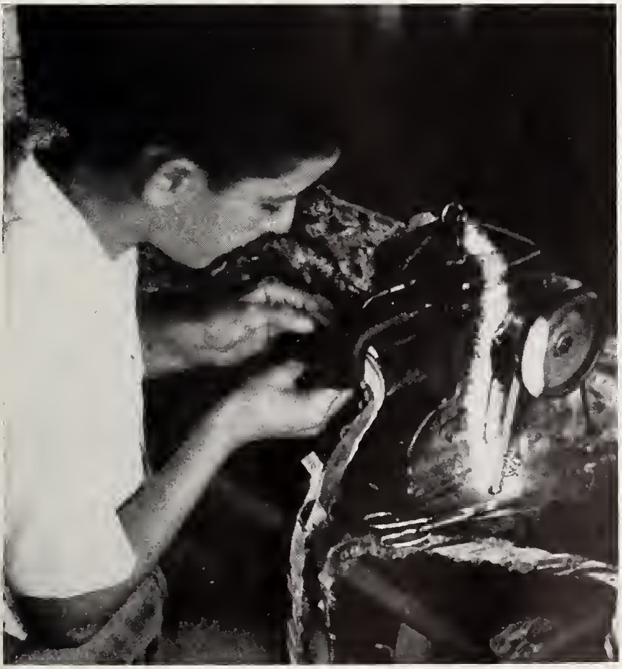
to determine how they will appear when sewn together. After the necessary changes, the pieces are sewn into strips on special sewing machines. Finally, the strips are made up into large uniform pieces. Depending on the size and quality of the scraps, from 200 to 2,000 pieces and from 1 week to 2 weeks of work are required to make the fur for a medium-sized coat.

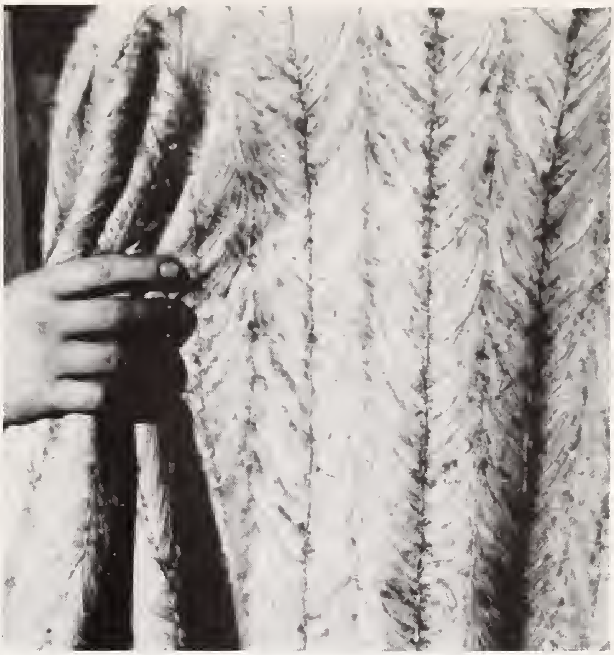
Some of the workshops construct coats, capes, and other garments from the "created" skins. Thus the exports are made up of completed garments as well as the large skins with which garments can be made.

The fur industry of Kastoria is, for the most part, a cottage industry. When a family has more work than it can do, outside persons are engaged, but they, too, often do the work in their homes. These workers are paid on the basis of the number of pieces they complete. Members of a family enterprise are not paid separate wages, however. The income is used to maintain the family, create dowries for the girls, and educate the children. Only about 5 percent of the enterprises are carried on in workshops with hired labor.

The standard of living in Kastoria is considerably higher than that of other small towns in western Macedonia. This fact is directly attributable to the town's fur industry, the income from which supplements the agricultural income of its residents.



Like pieces of fur are sewed into strips on a special machine.



The reverse side of a "created" skin shows the small size of the pieces and the angles of the seams in the strips.

This coat was made from hundreds of small pieces of fur.

The Soil Survey —A Blueprint for Development

by CHARLES S. SIMMONS

The phenomenal rate at which the world's population is growing has created the greatest need in history for fundamental knowledge of the soil—for scientific soil surveys. More and more food and more and more land on which to live are increasing pressures. True, soil surveys in themselves do not add a grain of wheat to the world's granaries or open new land for settlement. But they do supply information that makes it possible to increase production and guide colonization.

No engineer worthy of his profession would ever begin to build a bridge, road, or dam without making careful preliminary surveys of the terrain and substrata to determine whether his bridge will stand, whether his road will connect the places he wants to connect, and whether his dam will fill with water and then be strong enough to hold it. It is fully as important for an agriculturist drawing up an agricultural program for a country or area to have basic information about the country's soil. In several Latin American countries, where technical assistance programs have been in effect for several years, agriculturists and other technicians have been steadily accumulating such information and in so doing have fashioned a highly useful tool.

Many extensive areas of uncultivated land still exist in the Americas. Many present a challenge and temptation to governments desiring to increase agricultural output or to relieve congested populations. International agencies seeking homes for persons displaced from other lands also look at these uninhabited spaces with interest.

Which of these areas can be opened up and transformed into prosperous agricultural communities? Should roads be built into this area or into that one? What crops are best suited to a specific region? What average yields can be expected from these crops under various systems of management? These are some of the questions pertinent to the development of uninhabited areas. These are some of the questions that an evaluation of soils resources for agricultural production—a soil survey—help to answer.

The choice of a location for development should not be made by chance or expediency. Availability of water transportation afforded by a nearby river, flatness of land, ease of clearing and preparing the area for settlement—all these considerations are important but none is concerned with the adequacy of the area for growing crops and sustaining life. The natural or potential productivity of the soil must be considered. In many places, especially in the humid tropics, there are vast areas where all the readily apparent site advantages exist on what appears to be a very fertile soil. Dense tropical jungles that give the impression of a high state of fertility may actually be growing on soils that are thoroughly leached and extremely acid to depths of 10 feet or more. The forest may be growing luxuriantly merely because it is feeding on itself: As each leaf, twig, or tree falls and decays, the nutrients they release are picked up by the roots of living vegetation and used in new growth.

The thriving colony of Turen, Venezuela, established in the fall of 1949, testifies to the value of planning new settlements "from the ground up." Turen is located at the base of the eastern slope of the Andes, a region with generally leached, very poor acid soils. But, where the Acarigua River has covered the soil with fresh deposits, it is highly productive. Sponsors of the colony knew, of course, that the region contained some good soil when they proposed establishing the colony, but they had no precise information about it, for no soil survey had been made. Before investing money in the colonization project, the authorities had a survey made to determine the nature and extent of the soil suited to cultivation. Thus they learned beforehand that there was enough high-quality soil in the area to support an agricultural community.

Mr. Simmons is Technical Adviser on Soils, Instituto Agropecuario Nacional, Guatemala.

Turen is now well on the way to success and is already contributing substantially to the food supply of Venezuela.

The natural productivity of soils is certainly one of the principal factors limiting life. In many underdeveloped areas modern man depends, as primitive man depended, on the natural productivity of the soil for his livelihood. But all soils are not equally productive. Some are too stony, too wet, too dry, too sandy, too salty, too acid, or too low in mineral nutrients to make a fair return for the labor necessary to till them. Even soils that are equally productive vary widely in type.

These differences are highly important in plans to increase food production in both new and settled areas. For example, scattered widely over the world are agricultural experiment stations that spend large sums of money solely to learn ways to increase the productivity of the soils of a specific region. These stations should, of course, be located on a soil that is representative of a large part of the area. To locate them by chance or expediency without first making a soil survey and determining the location and extent of the several types of soil in the region is really starting to build a road without knowing where it is coming out. Data on fertilization and management practices are specific for the soils on which they are determined and not necessarily applicable to a place only a mile away. Most crops and even some strains of certain crops are selective in their environment, particularly their soil environment. In areas with widely differing soil conditions, it may be necessary to plan for several outlying field stations in order to service the entire region. It is rare indeed when soil conditions over an entire state or country are so

Soil samples from this cinchona plantation in Guatemala will help determine the location of new plantings.

uniform that one experiment station can determine data that are applicable to the entire area.

Still another specific use for soil surveys may be pointed out. In times of national emergency, in wartime, for instance, it may be necessary to increase suddenly the production of a certain crop. When the characteristics of the soils of a country are known, it is relatively simple to predict the success or failure, in any specific spot, of any crop for which the soil requirements are known. Time and money in exploration for sites would then be saved. Too, the information gathered in a systematic way by trained men should be more accurate than that compiled hurriedly and under stress.

Guatemala is one Latin American country that appreciates the value of long-range soils planning. In 1949, money was made available for a reconnaissance survey of the entire country. Guatemala is about the size of Pennsylvania but its economy is notably different. Guatemala is an agricultural country with very little industry. When a program of development, or fomento as it is called in Spanish, was set up for agriculture a few years ago, the soil survey was one of the first things requested. The survey is now practically completed and should be of considerable value in the accelerated agricultural program that is currently being initiated.

In fact it has already proved valuable. Guatemala has many small valleys too dry for intensive agriculture. Many requests and proposals have been made for developing irrigation in one or more of them. The one most talked about in government circles and the press has been Zacapa Valley. When a detailed soil survey was made, however, it revealed that a large part of the valley consists of soil so heavy that special methods of management would have to be developed to bring them into production. To date no money has been spent to bring water into the valley. The soil survey that cost much less than $10,000 has demonstrated that it is not feasible to spend $4,000,000—a 1928 estimate of engineering and development costs—to bring water to an area of doubtful productivity.

Thus we see the importance of knowledge of the soil to any agricultural endeavor. Be it the general agricultural health of a community, colonization or resettlement, the location of experiment stations, or the interpretation of experimental data, the nature of the soil may well be the factor limiting success. A study of the soil in the field and a map showing the results of those studies—a soil survey—affords the most accurate and inexpensive means of meeting these needs.

Soils are growing, dynamic bodies, and their characteristics reflect the environment under which they have developed. An experienced soil surveyor, one trained in the genesis and classification of soils, can, after an examination of the soil in an area strange to him, tell much about its climate, its productivity, and the crops suited to it.

Reading about... Foreign Agriculture

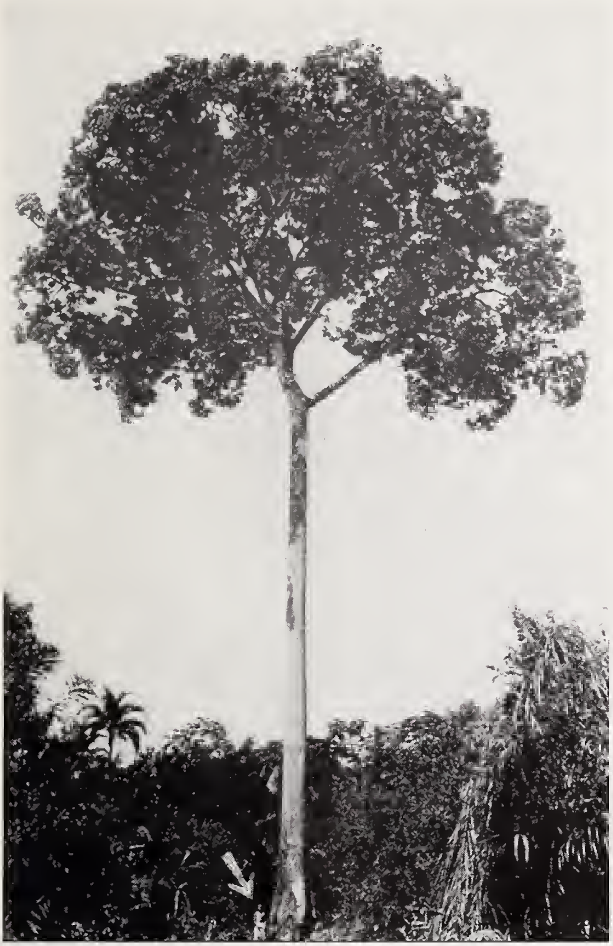
"Agriculture of Uruguay" is the first comprehensive study on Uruguay's agricultural economy to be published by the Office of Foreign Agricultural Relations and the latest in its series of country studies.

Written by Constance H. Farnworth, agricultural economist in the Latin American Division, the bulletin surveys not only Uruguay's agriculture but various related phases of its economy as well, such as its soils, topography, population, education, transportation, government, land use, rural credit, marketing facilities, prices, farm labor, and wages. The livestock industry and crop production are described in detail, and a chapter is given to the government's postwar agricultural policy. Uruguay's foreign trade and trade policy and the place that Uruguay occupies in United States trade are analyzed.

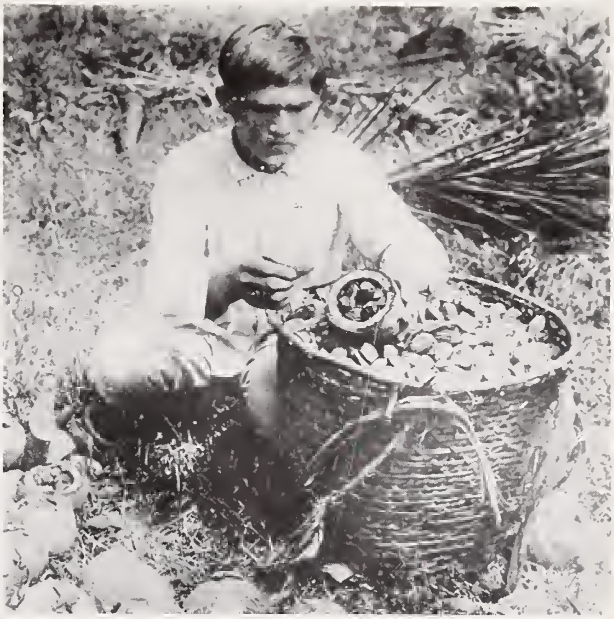
Uruguay is a small country, about 72,150 square miles in area, with a population of about 2.5 million people and an economy based largely on the production of livestock. Wool, the country's primary export, is the main source of foreign exchange for imports of a wide variety of manufactured products, semifinished products, fuels, and raw materials. In general, Uruguayans live well, having a per capita caloric intake that compares favorably with that of the United States. They have a high degree of literacy and reasonably high purchasing power.

The new study of Uruguay is No. 3 in the Foreign Agriculture Bulletin series. It has 63 pages, 21 maps and charts, plus 109 tables and a detailed bibliography. The publication may be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. for 35 cents.

Brazil Nuts—Holiday Treat from the Amazon



The Brazil nut tree grows 75 to 100 feet tall and towers above the surrounding jungle.



Brazil nuts in their pods are arranged like orange segments.

From the jungles of the Amazon Basin comes the Brazil nut, a familiar accessory to holiday festivities in the United States and an important item in Brazilian-United States trade. Virtually all Brazil nuts come from wild trees but a few plantations are now being established and research is under way to find new uses for the nuts.

Brazil nuts grow in a pod, which holds from 12 to 20 nuts and somewhat resembles a coconut with the outer husk removed. The pods fall naturally from the trees and are harvested by native gatherers who open them with long knives and later deliver the nuts to collecting stations along the Amazon and its tributaries. From these points the nuts go to Belém, Manaos, and other ports for shipment.

Pepper

When the Gothic conqueror Alaric captured Rome in 408 A.D. his ransom demands included 3,000 pounds of black pepper. Housewives purchasing this most popular of all spices during recent years have no doubt felt that history has made a complete cycle and pepper is again worth a King's ransom. From a low of 4 cents a pound in 1934, the wholesale price of black pepper advanced to more than $2.50 in 1950 and only now is pepper beginning to be more plentiful as the war-ravaged fields of Indonesia come back into production.

One result of shortages and high prices is that the United States Department of Agriculture has received numerous inquiries from individuals who want to know if they can grow pepper in their back-yard gardens and thus free themselves from the vagaries of the world market. The answer is that you can—provided you live within 20 degrees of the equator in an area having upwards of 100 inches of annual rainfall.

Piper nigrum, the source of both black and white pepper, is a climbing shrub native to the forests of the Malabar coast of southern India. The date of pepper's first use as a condiment is unknown, but from the time of Marco Polo it was an important article of commerce between Europe and the Orient and shared cargo space with silk and precious jewels in the caravans that plied the Great Silk Route throughout the Middle Ages. The search for pepper and other spices led the ships of Vasco de Gama around the tip of Africa and Columbus across the Atlantic.

The history of pepper growing has been one of wide fluctuations in supply and price over cycles of varying length. Recurring periods of high prices have stimulated plantings, leading to overproduction, low prices, and subsequent abandonment.

During modern times the Dutch East Indies (now Indonesia) became the world's largest producer of pepper, providing about 80 percent of United States imports prior to World War II. Its culture, largely at the hands of Chinese farmers, was developed to a high state.

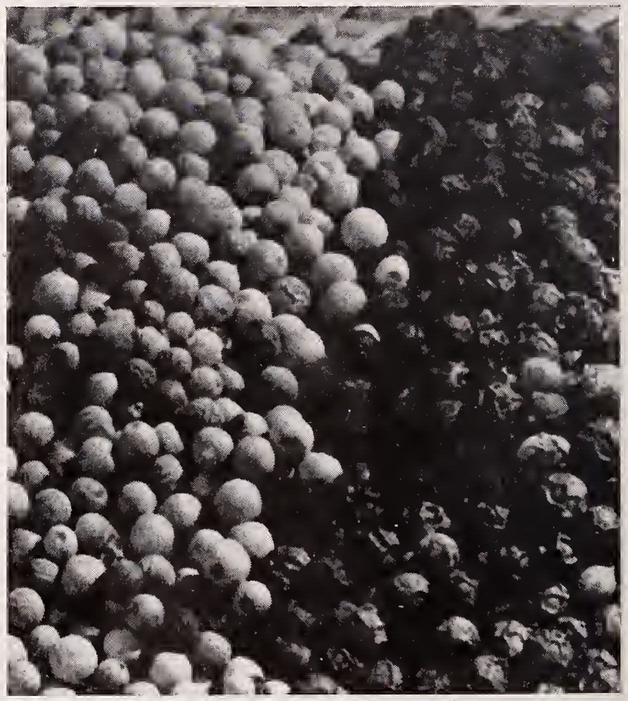
Pepper may be propagated from seed or, preferably, from cuttings planted directly in the fields during the rainy season or started in nursery beds until the roots have developed sufficiently to permit transplanting. The stems produce numerous rootlets at their swollen joints, and with these the plant attaches itself to its support much in the manner of ivy. Supports may be either hardwood posts or living trees, preferably of a leguminous variety to add to soil fertility as well as provide a measure of shade required by the pepper vine.

As the young plant grows, it is periodically pruned to stimulate hardier growth, and no fruit is harvested until the fifth or sixth year, when the vine has fully matured. The vines flower in April or May and put out numerous spikes with a berry-like fruit which is green at first, then red, and finally yellow. Black pepper owes its pungency to resins in the outer skin of the berry and its flavor to volatile oils of the berry itself.

Depending on local climate, harvesting takes place from September to November. Workmen use ladders and pick the berry-laden spikes into baskets.

If black pepper is desired, picking is done as the fruit begins to turn red, and the harvest is spread on mats to dry in the sun. When completely dry, the berries, which have become shriveled and black, are broken off the spikes by hand, by threshing with sticks, or tramping with bare feet. Finally the berries are cleaned by winnowing and sometimes hand-sorted for size and quality.

If the final product is to be white pepper, the fruit is harvested at a later stage of maturity and



White pepper is made from skinned berries (left); black pepper comes from the whole berry (right).

Pepper berries grow on a climbing shrub. Most of the world's pepper plantings are in India and Indonesia.

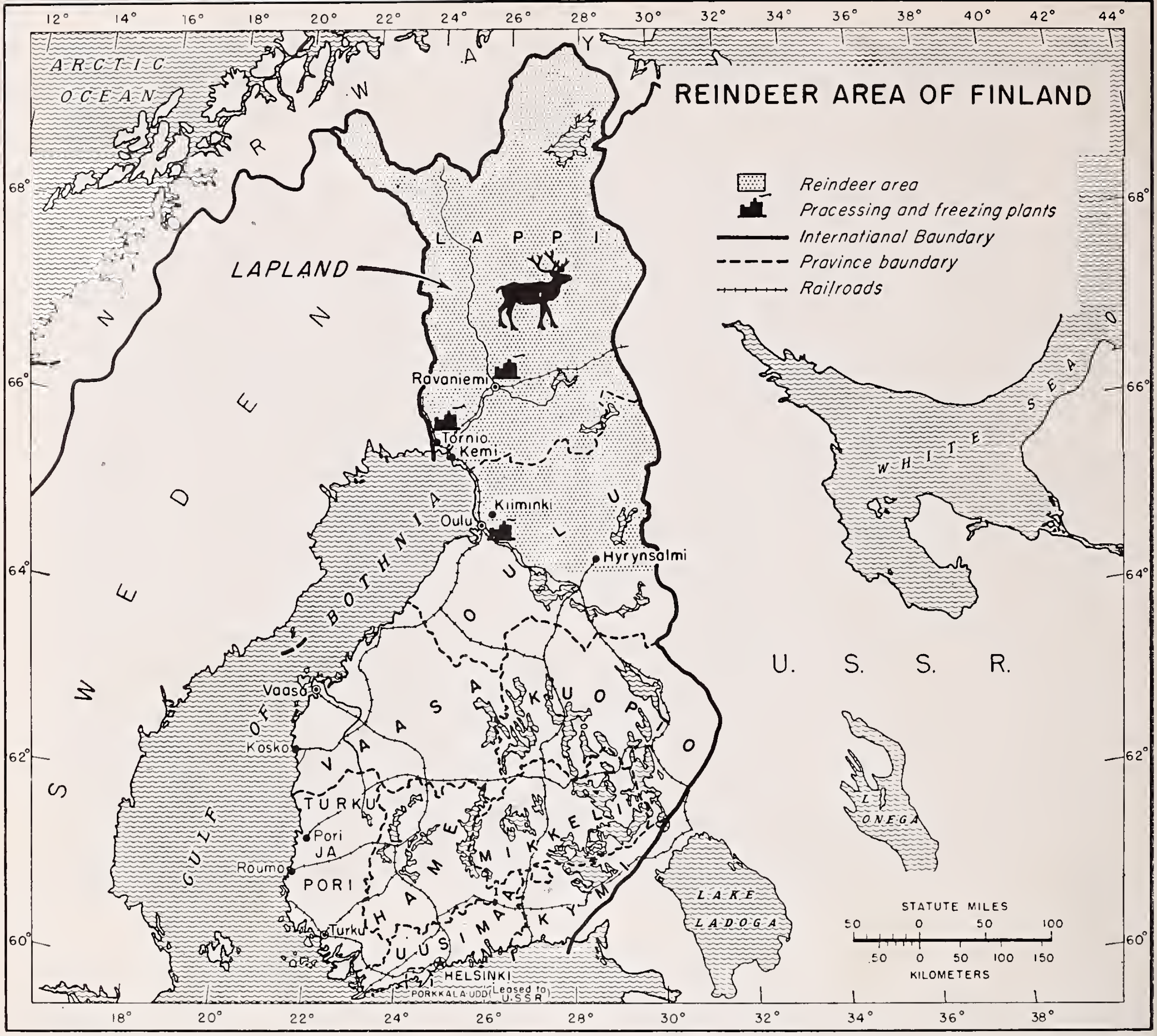
soaked in water for a number of days to loosen the skins, which are removed by stamping in tubs. The remaining mild-flavored berries are then sun-dried.

Pepper culture has been a subject of scientific inquiry for many years and a considerable body of literature concerning varieties, fertilization, harvesting, and processing exists. Pepper thrives on well-drained land at moderate altitudes and some is grown in most humid areas of Southeast Asia.

Numerous attempts have been made to introduce commercial pepper growing into the Western Hemisphere, and, though pepper is grown to some extent in the Caribbean countries, Central America, and Brazil, it has never assumed any importance in the exports of these countries. Introduction of Asian varieties has been hampered by the fact that seed-grown stock will not reproduce true to type and cuttings have been unable to withstand the hazards of trans-Pacific shipping.

With the Japanese occupation of the East Indies during the war and subsequent near-destruction of the plantations, importation of pepper into the United States ceased, but a large reserve in this country delayed any severe shortage until the postwar years, when imports have been resumed, but not in enough volume to keep up with demand.

In recent years India has replaced Indonesia as the chief supplier of pepper for American tables, but total imports are only about one-half the prewar level. It was thought that Indonesian vines were a complete loss as a result of war conditions and neglect, but it was found that by cutting back, mulching, and vigorous fertilizing many of them could be brought back into production. This rehabilitation, together with new plantings in India as well as in Indonesia, may be expected to end the current cycle of shortage and bring pepper back into plentiful world supply.



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